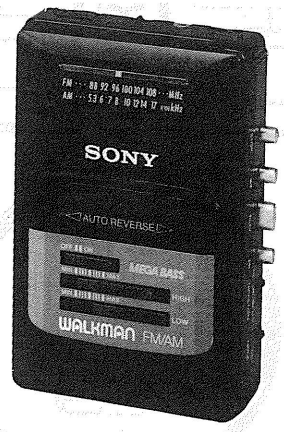
WM-AF50

SERVICE MANUAL

US Model
Canadian Model



Model Name Using Similar Mechanism	New Mechanism
Tape Transport Mechanism Type	MT-WMA26-19

SPECIFICATIONS

Radio
FM: 87.6—108 MHz
AM: 530—1,710 kHz

Power requirements
3 V DC Batteries R6 (AA) × 2
BP-700 rechargeable battery
External DC 3 V power sources

Battery life
(Approximate hours)

	Playback	FM
Sony Alkaline AM3 (N)	8 hrs.	30 hrs.
Rechargeable BP-700	2 hrs.	6 hrs.

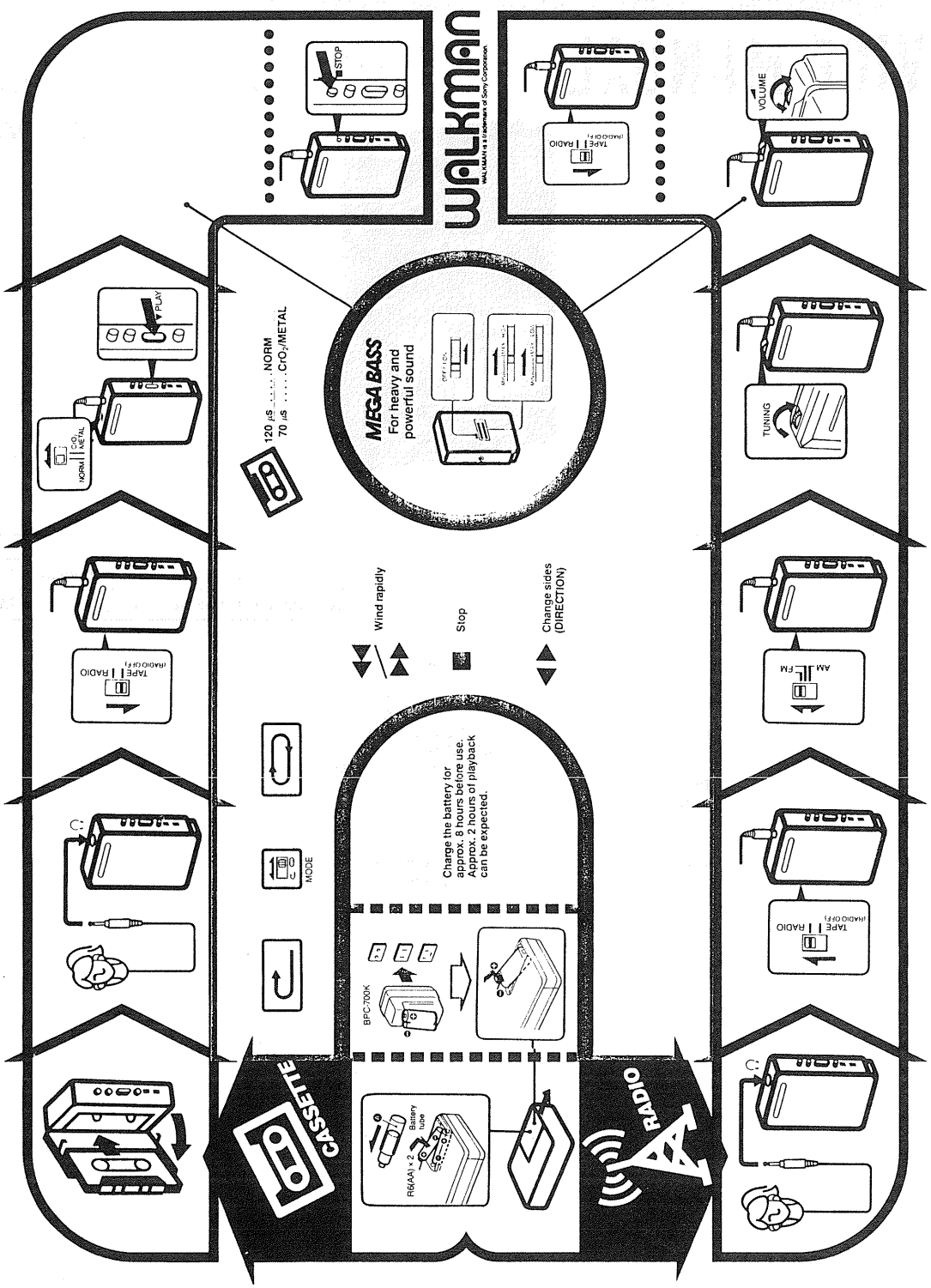
Accessories supplied
Stereo headphones (open-air type, 1) Beltclip (1)
Battery tube (1)

MICROFILM

RADIO CASSETTE PLAYER

SONY®

SECTION 1
GENERAL



Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

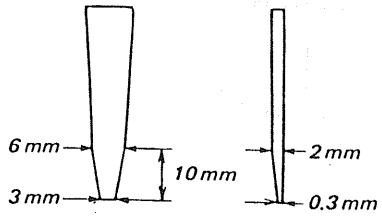
Flexible Circuit Board Repairing

- Keep the temperature of the soldering iron around 270°C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

SECTION 2
DISASSEMBLY

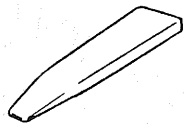
2 – 1. DISASSEMBLY

Note: • Follow the disassembly procedure in the numerical order given.
• It is recommended to prepare a plastic wedge shown below for rear cabinet removal.
(Using a precision screwdriver for a plastic wedge may flaw the cabinet face.)



(same material as the cabinet or softer.)

a plastic wedge

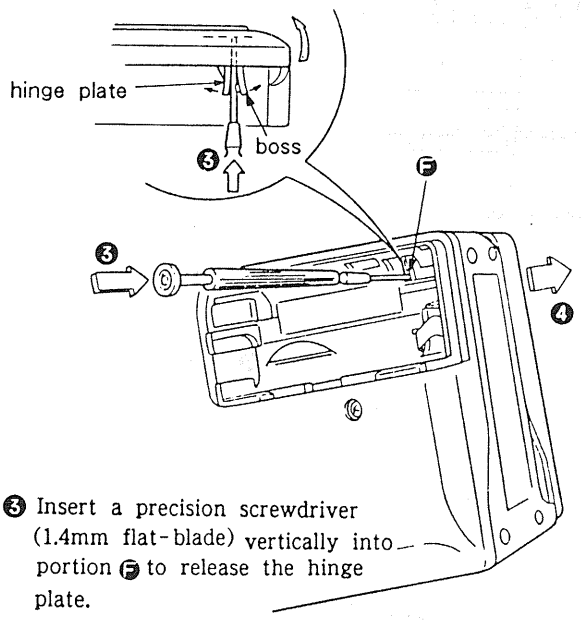


• *Demensions are for a reference.*

CASSETTE HOLDER

❶ Remove the battery lid.

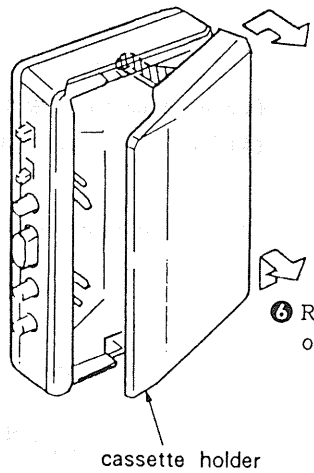
❷ Hold the front cabinet firmly.



❸ Insert a precision screwdriver (1.4mm flat-blade) vertically into portion Ⓕ to release the hinge plate.

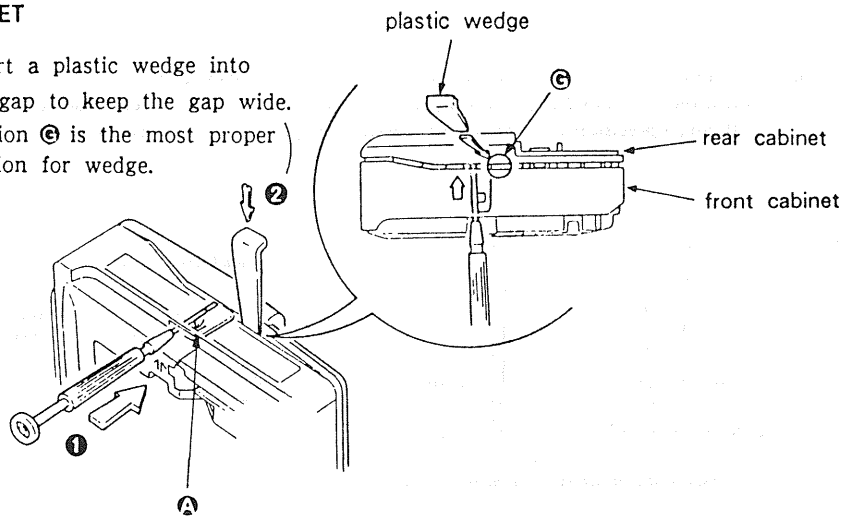
❹ Remove bottom side of the cassette holder slowly.

❺ Remove hatched portion.

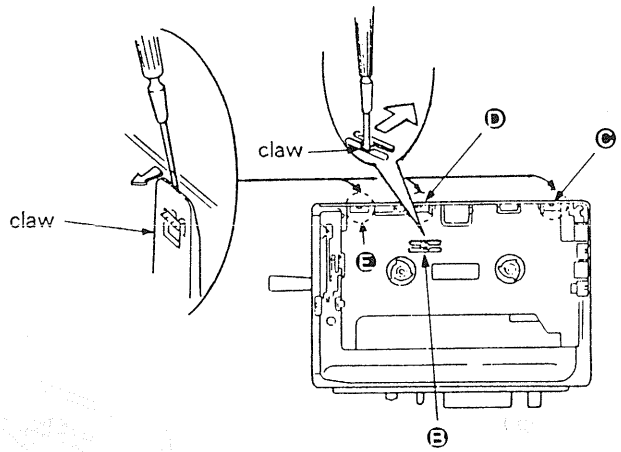


REAR CABINET

❷ Insert a plastic wedge into the gap to keep the gap wide. (Portion Ⓒ is the most proper portion for wedge.



❶ Insert the screwdriver into the slit at claw Ⓐ, and release the claw.

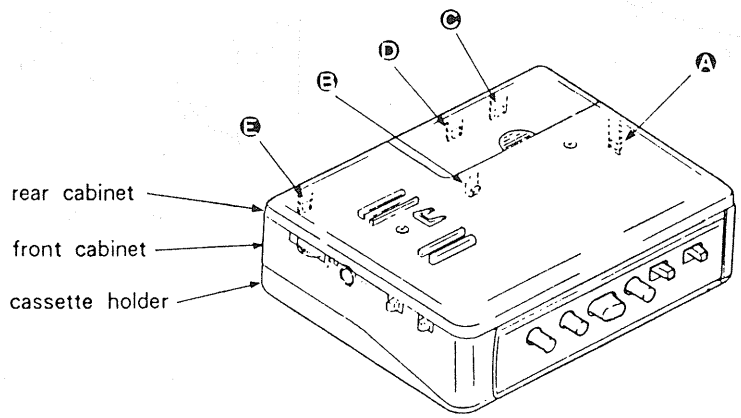


❸ Release all claws Ⓑ to Ⓔ in the alphabetical order.

❹ Remove the rear cabinet.

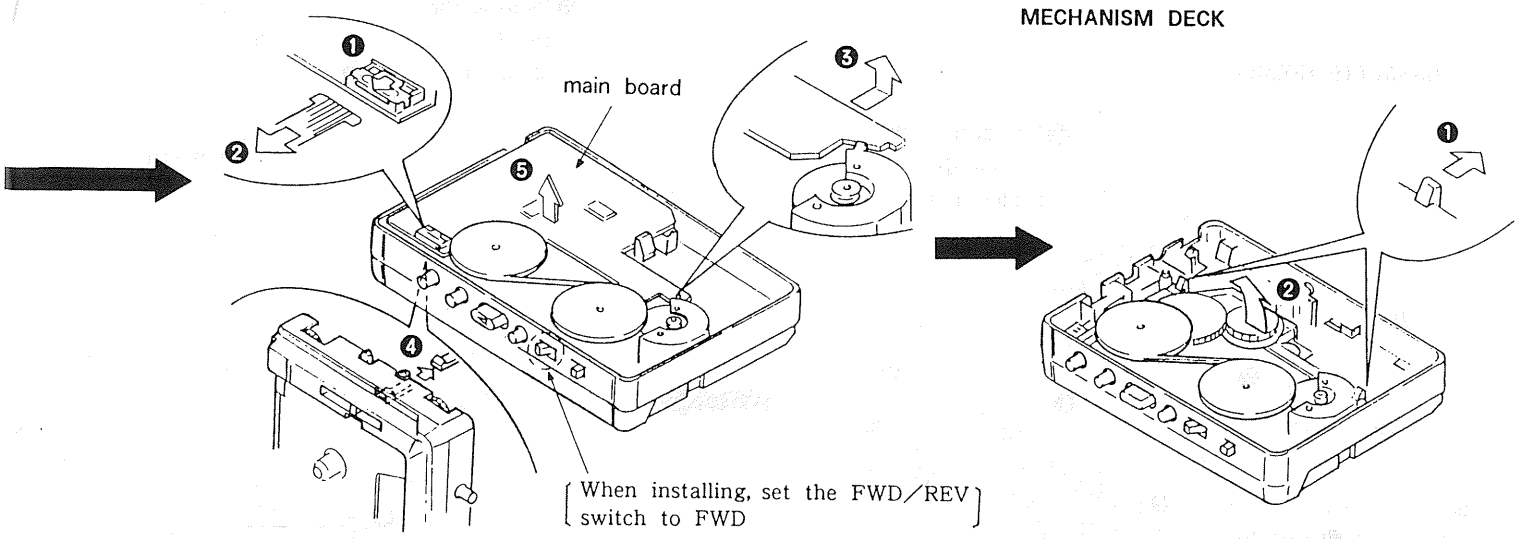
Location and Shape of Claws.

Ⓐ to Ⓔ: claws

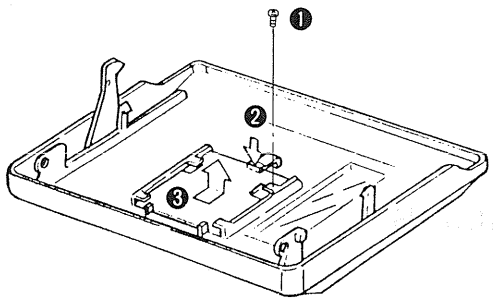


MAIN BOARD

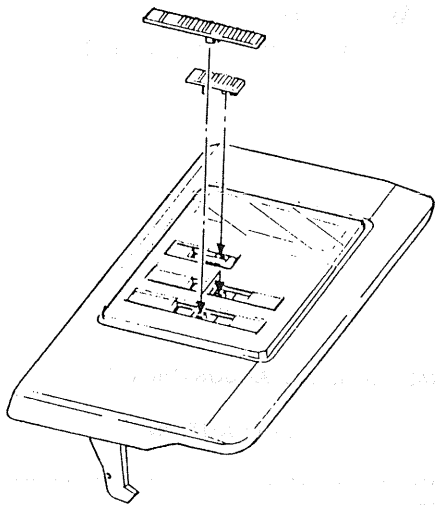
MECHANISM DECK



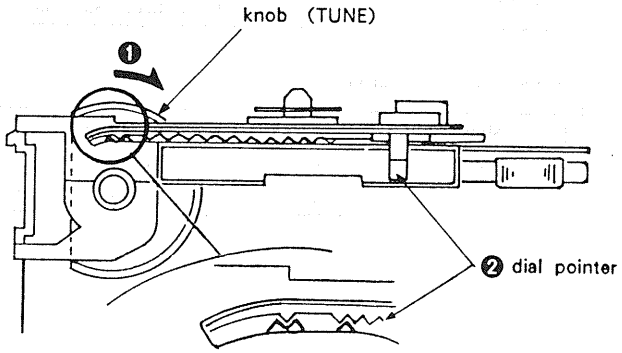
DBB UNIT



(caution on installing)



2 – 2. DIAL POINTER SETTING



❶ Turn the knob (TUNE) fuly in the direction shown by arrow.

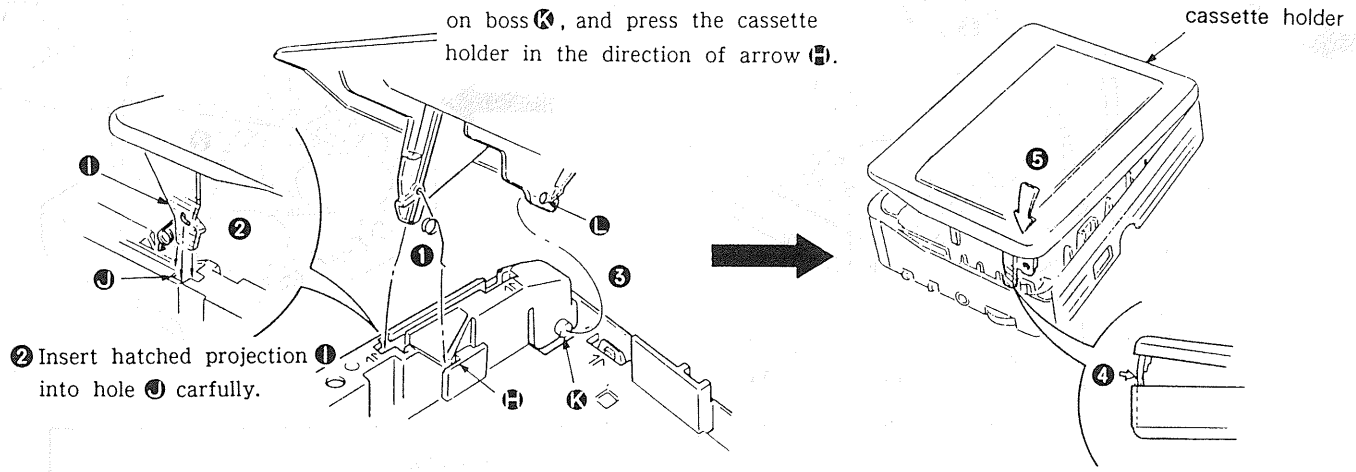
❷ Set the dial pointer so that ▽ potion of the dial pointer coincides to △△ potion of the knob (TUNE).

2 – 3. ASSEMBLY

CASSETTE HOLDER

❸ Put portion Ⓛ of the hinge plate on boss Ⓚ, and press the cassette holder in the direction of arrow Ⓗ.

❺ Depress the cassette holder against the front cabinet a little hard as shown by arrow ❺.



❷ Insert hatched projection ❶ into hole Ⓙ carfully.

❶ Insert the end of the spring into a small hole at the bottom of portion Ⓗ.

❹ On the volume side, push the hatched portion lightly in the direction of arrow ❹ into the front cabinet.

SECTION 3
ADJUSTMENTS

3 – 1. MECHANICAL ADJUSTMENTS

PRECAUTION

1. Clean the following parts with a denaturedalcoholmoistened swab:
   playback head — pinch roller
   capstan — rubber belts
2. Demagnetize the playback head with a head demagnetizer.
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage (2.5V) unless otherwise noted.

Torque Measurement

Mode	Torque meter	Meter reading
FWD	CQ-102C	20–35 g·cm (0.28–0.48 oz·inch)
FWD Back Tension		less than 3 g·cm (less than 0.04 oz·inch)
REV	CQ-102RB	20–35 g·cm (0.28–0.48 oz·inch)
REV Back Tension		less than 3 g·cm (less than 0.04 oz·inch)
FF, REW	CQ-201B	more than 60 g·cm (more than 0.83 oz·inch)

Tape Tension Measurement

Mode	Tension meter	Meter reading
FWD	CQ-403A	more than 65 g (more than 2.3 oz)
REV	CQ-403R	

3 – 2. ELECTRICAL ADJUSTMENTS

PRECAUTION

- Supplied voltage : 2.5V
- Switch and control position
  SENS/BAND switch : FM DX
  TAPE switch : NORM
  VOLUME control : maximum

CASSETTE SECTION

FUNCTION switch: TAPE

TEST TAPE

Type	Signal	Used for
WS-48A	3 kHz, 0 dB	Tape Speed Adjustment
P-4-A100	10 kHz, -10 dB	Playback Head Azimuth check

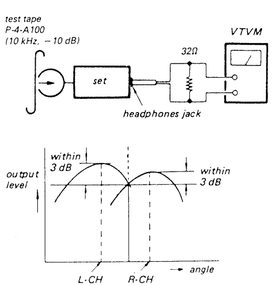
PLAYBACK HEAD AZIMUTH CHECK

- **Perform this check both in FWD and REV mode.**

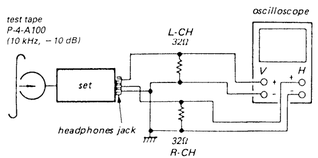
Note: This set is not featured the head azimuth adjustment.
When replacing the head, check the both L-ch and R-ch output levels and also those phases.

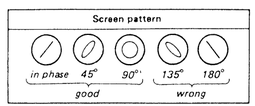
Procedure:

1. Level Check
   Mode: playback



2. Phase Check
   Mode: playback

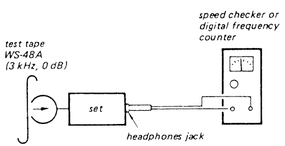




TAPE SPEED ADJUSTMENT

Procedure:

Mode: playback

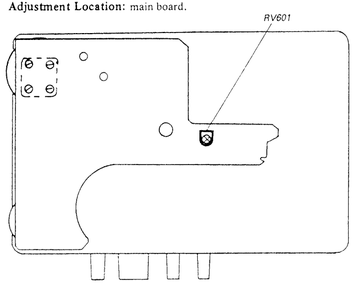


Specification:

speed checker	digital frequency counter
±1%	2,970 – 3,030 Hz

Frequency difference between the beginning and the end of the tape should be within ±2.5% (±75 Hz).

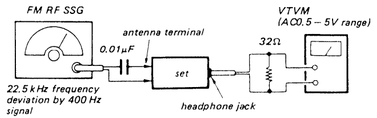
Adjustment Location: main board.



RADIO SECTION

- FUNCTION switch: TAPE

FM SECTION



- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

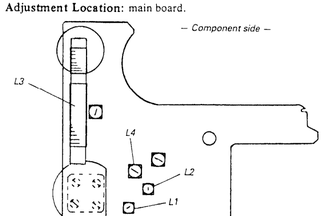
FM Frequency Coverage Adjustment

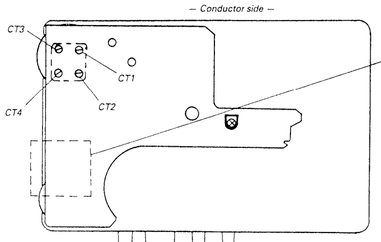
Pointer position	SG frequency	Adjustment part	Reading on VTVM
f minimum	87 MHz	L2	maximum
f maximum	109.5 MHz	CT2	

FM Tracking Adjustment

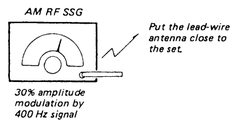
SG and set frequency	Adjustment part	Reading on VTVM
87 MHz	L1	maximum
109.5 MHz	CT1	

Adjustment Location: main board.

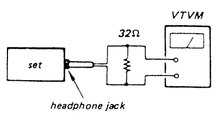




AM SECTION



- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.

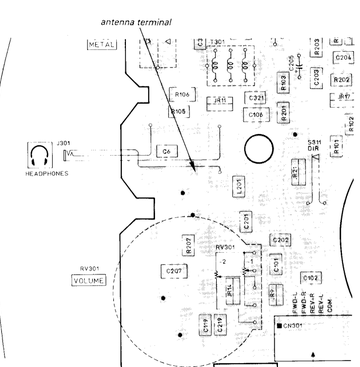


AM Frequency Coverage Adjustment

Pointer position	SG frequency	Adjustment part	Reading on VTVM
f minimum	525 kHz	L4	maximum
f maximum	1,720 kHz	CT4	

AM Tracking Adjustment

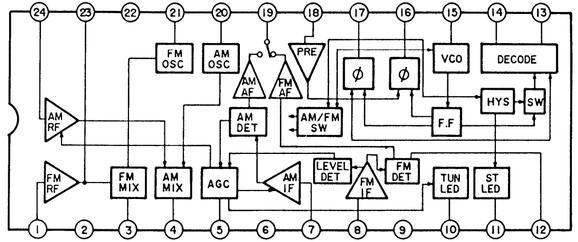
SG and set frequency	Adjustment part	Reading on VTVM
600 kHz	L3	maximum
1,400 kHz	CT3	



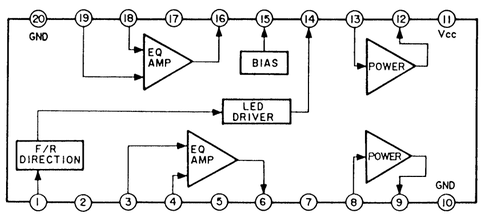
SECTION 4
DIAGRAMS

4 – 1. IC BLOCK DIAGRAMS

TA8122AF



LA4580M



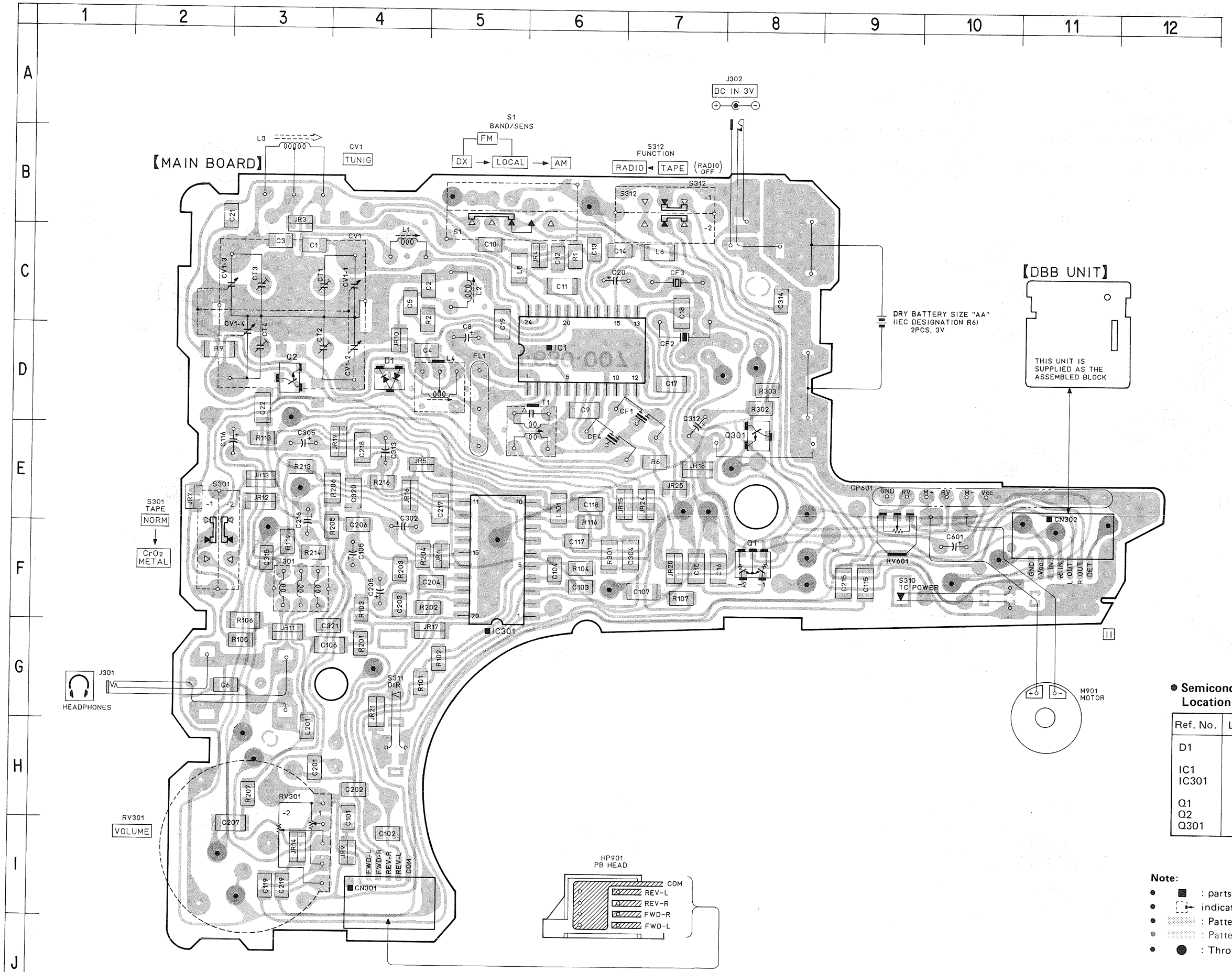
Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50WV or less are not indicated except for electrolytics and tantaliums.
- All resistors are in Ω and 1/8W or less unless otherwise specified.
- △ : internal component.
- B+ : B+ Line
- ▭ : adjustment for repair.
- Total current is measured with no cassette installed.
- Power voltage is dc 3 V and fed with regulated dc power supply from external power voltage jack.
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
  no mark : PB or FM
  ( ) : AM
- Voltages are taken with a VOM (input impedance 10M Ω) Voltage variations may be noted due to normal production tolerances.
- Signal path.
  ⇨ : FM ⇨ : PB

【MAIN BOARD】

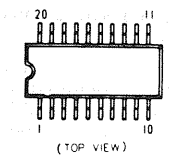
【DBB UNIT】

CP601【SERVO UNIT】

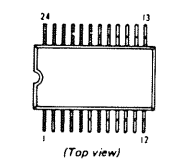


● Semiconductor Lead Layouts

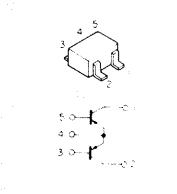
LA4580M



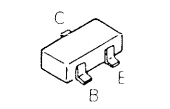
TA8122AF



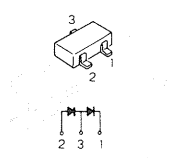
XN1215



2SC2715



1SS226



● Semiconductor Location

Ref. No.	Location
D1	D-4
IC1	D-6
IC301	F-5
Q1	F-8
Q2	D-3
Q301	E-8

Note:

- ■ : parts mounted on the conductor side.
- [ ]→ indicates side identified with part number.
- : Pattern on the side which is seen.
- : Pattern of the rear side.
- ● : Through hole.

SECTION 5
EXPLODED VIEWS

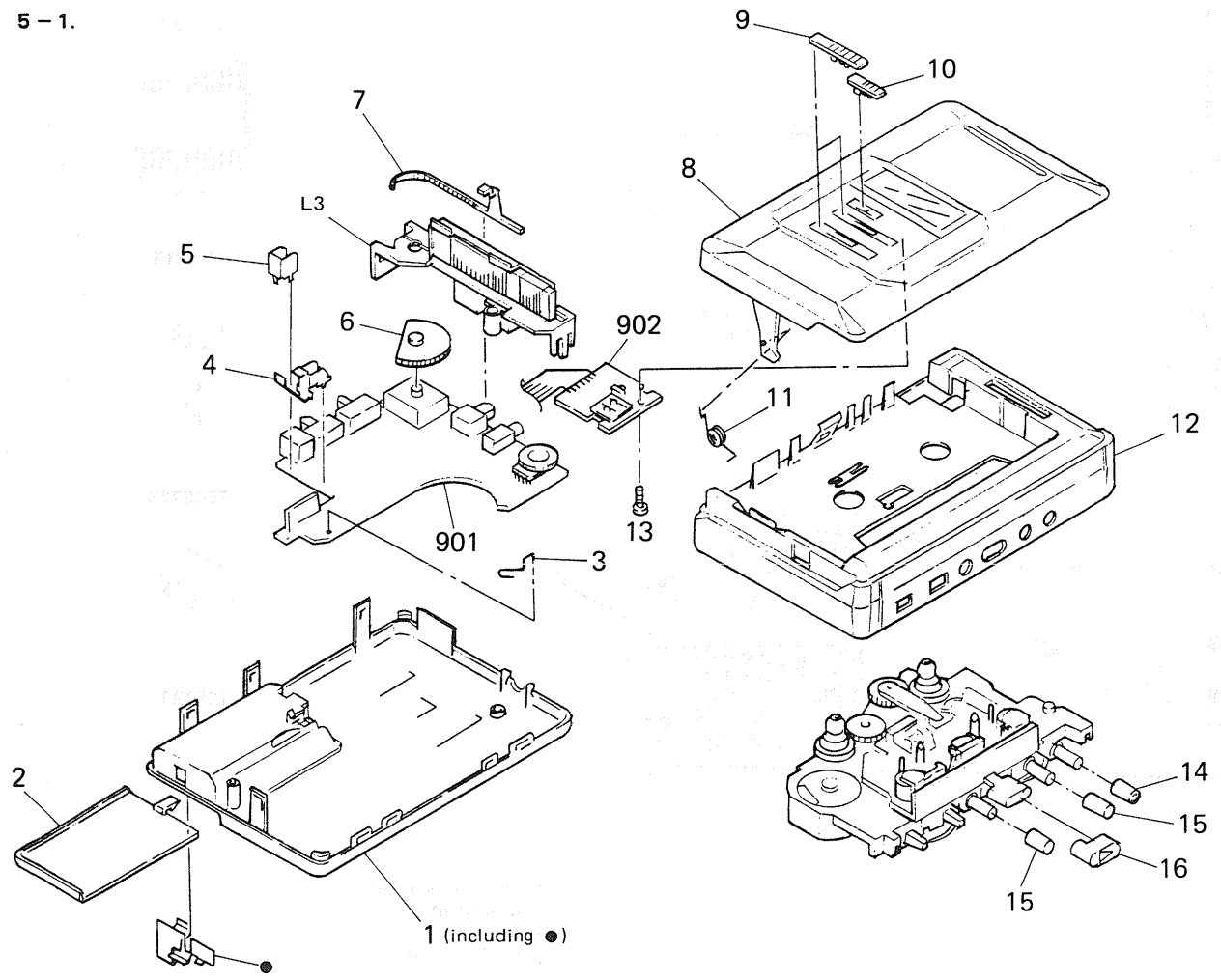
NOTE:

- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- Due to standardization, parts with part number suffix -XX and -X may be different from the parts specified in the components used on the set.
- Color Indication of Appearance Parts
  Example:
  (RED) . . . KNOB, BALANCE (WHITE)
  ↑ ↑
  Cabinet's Color Parts' Color

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

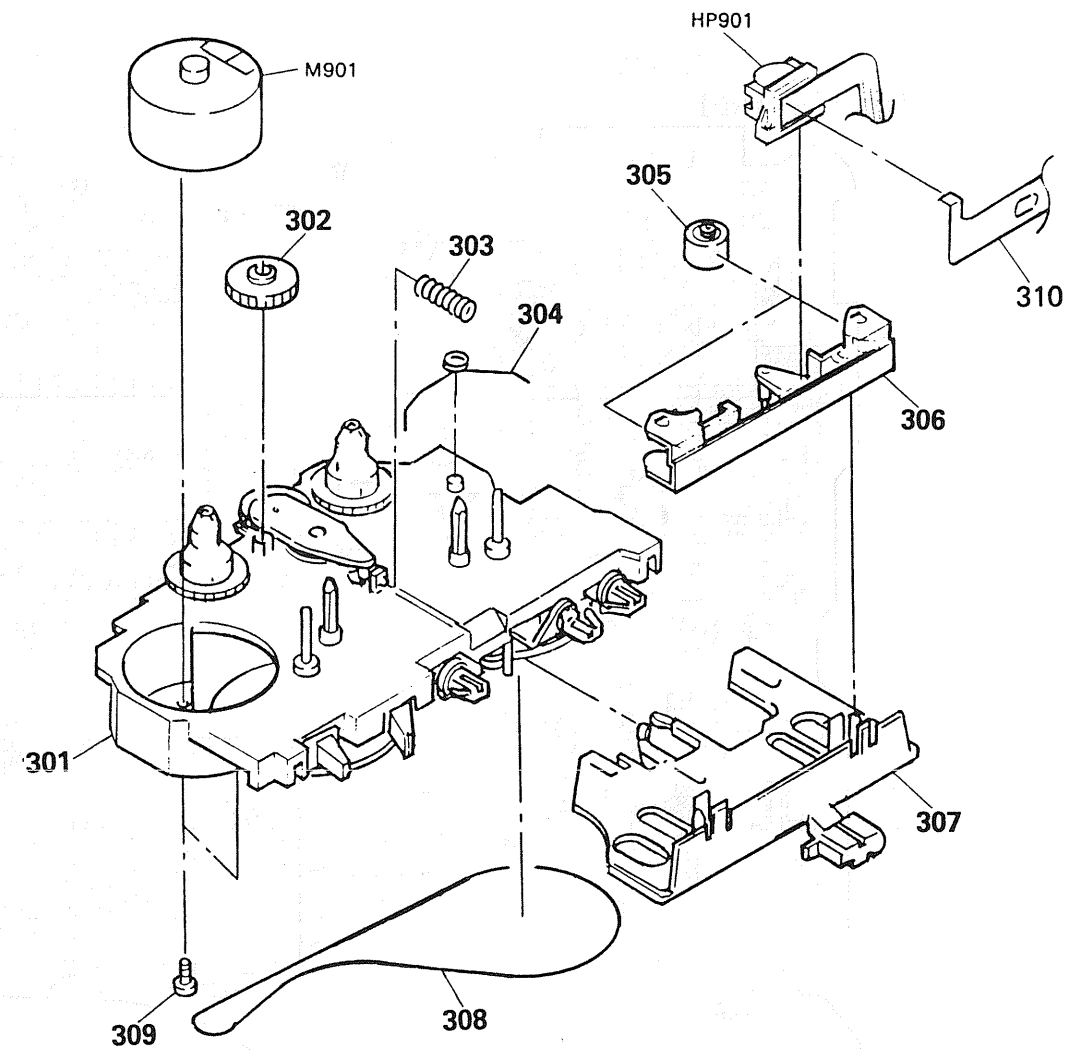
Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifé.

5 – 1.



No.	Part No.	Description	Remarks
1	X-3346-722-1	CABINET (REAR) (CF) ASSY	
2	3-351-535-01	LID, BATTERY CASE	
3	3-351-739-11	SPRING	
4	3-351-531-01	TERMINAL BOARD (M), BATTERY	
5	3-351-530-01	TERMINAL BOARD (P), BATTERY	
6	3-351-536-01	KNOB (TU)	
7	3-351-537-01	RACK, POINTER	
8	X-3346-736-1	HOLDER (CF-C) ASSY, CASSETTE	
9	3-351-534-01	KNOB (SLIDE)	
10	3-351-533-01	KNOB (DBB)	
11	3-351-523-01	SPRING, TORSION	
12	X-3346-742-1	CABINET (FRONT) (CF) ASSY (H)	
	X-3346-743-1	CABINET (FRONT) (CF) ASSY (C)	
13	3-318-382-61	SCREW (1.7X2.5), TAPPING	
14	3-351-529-11	BUTTON (S)	
15	3-351-528-11	BUTTON (FR)	
16	3-351-527-11	BUTTON (P)	
901	A-3270-561-A	PC BOARD ASSY, MAIN	
902	1-466-101-21	DBB UNIT	
L3	1-402-415-21	ANTENNA, FERITE-ROD (AM)	

5 – 2. MECHANISM DECK (MT-WMA26-19)



No.	Part No.	Description	Remarks
301	X-3346-795-1	CHASSIS SUB ASSY	
302	3-351-597-01	GEAR (R)	
303	3-351-715-01	SPRING, COMPRESSION	
304	3-351-710-01	SPRING (PREVENTION), TORSION	
305	3-352-737-01	PINCH ROLLER	
306	3-351-732-01	PINCH LEVER	
307	3-351-733-01	LEVER, PLAY	
308	3-351-599-11	BELT	
309	7-627-852-38	SCREW, PRECISION +P1.7X1.8 TYPE3	
310	*3-351-792-01	PAPER, SHIELD	
HP901	1-543-596-11	HEAD, MAGNETIC (PLAYBACK)	
M901	1-541-648-11	MOTOR, DC	

SECTION 6
ELECTRICAL PARTS LIST

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- Items marked "★" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:
MF: μF, PF: μμF.

RESISTORS
- All resistors are in ohms.
- F: nonflammable

COILS
- MMH: mH, UH: μH

SEMICONDUCTORS
In each case, U: μ, for example:
UA...: μA..., UPA...: μPA..., UPC...: μPC, UPD...: μPD...

The components identified by mark ⚠ or dotted line with mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifiés par une marque ⚠ sont critiques pour la sécurité.
Ne les remplacer que par une pièce portant le numéro spécifié.

Ref.No.	Part No.	Description		
901	A-3270-561-A	PC BOARD ASSY, MAIN		
902	1-466-101-21	DBB UNIT		
C1	1-163-102-00	CERAMIC CHIP 24PF	5%	50V
C2	1-162-641-11	CERAMIC CHIP 24PF	5%	50V
C3	1-163-087-00	CERAMIC CHIP 4PF	0.25PF	50V
C4	1-163-091-00	CERAMIC CHIP 8PF	0.25PF	50V
C5	1-163-241-11	CERAMIC CHIP 39PF	5%	50V
C6	1-163-009-11	CERAMIC CHIP 0.001MF	10%	50V
C8	1-126-157-11	ELECT 10MF	20%	16V
C9	1-163-074-00	CERAMIC CHIP 0.033MF		50V
C10	1-163-009-11	CERAMIC CHIP 0.001MF	10%	50V
C11	1-162-638-11	CERAMIC CHIP 1MF		16V
C12	1-164-004-11	CERAMIC CHIP 0.1MF	10%	25V
C13	1-164-004-11	CERAMIC CHIP 0.1MF	10%	25V
C14	1-164-004-11	CERAMIC CHIP 0.1MF	10%	25V
C15	1-163-075-00	CERAMIC CHIP 0.047MF	10%	25V
C16	1-163-075-00	CERAMIC CHIP 0.047MF	10%	25V
C17	1-162-638-11	CERAMIC CHIP 1MF		16V
C18	1-162-638-11	CERAMIC CHIP 1MF		16V
C19	1-163-074-00	CERAMIC CHIP 0.033MF		50V
C20	1-124-431-00	ELECT 33MF	20%	4V
C21	1-163-109-00	CERAMIC CHIP 47PF	5%	50V
C22	1-163-205-00	CERAMIC CHIP 0.001MF	10%	50V
C101	1-163-133-00	CERAMIC CHIP 470PF	10%	50V
C102	1-163-133-00	CERAMIC CHIP 470PF	10%	50V
C103	1-163-117-00	CERAMIC CHIP 100PF	5%	50V
C104	1-163-117-00	CERAMIC CHIP 100PF	5%	50V
C105	1-124-432-00	ELECT 47MF	20%	4V
C106	1-163-061-00	CERAMIC CHIP 0.015MF	10%	50V
C107	1-162-638-11	CERAMIC CHIP 1MF		16V
C115	1-162-638-11	CERAMIC CHIP 1MF		16V
C116	1-124-434-00	ELECT 220MF	20%	4V
C117	1-163-009-11	CERAMIC CHIP 0.001MF	10%	50V
C118	1-163-034-00	CERAMIC CHIP 0.033MF		50V
C119	1-163-009-11	CERAMIC CHIP 0.001MF	10%	50V
C201	1-163-133-00	CERAMIC CHIP 470PF	10%	50V
C202	1-163-133-00	CERAMIC CHIP 470PF	10%	50V
C203	1-163-117-00	CERAMIC CHIP 100PF	5%	50V
C204	1-163-117-00	CERAMIC CHIP 100PF	5%	50V
C205	1-124-432-00	ELECT 47MF	20%	4V
C206	1-163-023-00	CERAMIC CHIP 0.015MF	10%	50V
C207	1-162-638-11	CERAMIC CHIP 1MF		16V
C215	1-162-638-11	CERAMIC CHIP 1MF		16V
C216	1-124-434-00	ELECT 220MF	20%	4V
C217	1-163-205-00	CERAMIC CHIP 0.001MF	10%	50V
C218	1-163-074-00	CERAMIC CHIP 0.033MF		50V
C219	1-163-009-11	CERAMIC CHIP 0.001MF	10%	50V
C302	1-124-434-00	ELECT 220MF	20%	4V
C304	1-162-638-11	CERAMIC CHIP 1MF		16V
C305	1-124-434-00	ELECT 220MF	20%	4V
C312	1-124-432-00	ELECT 47MF	20%	4V
C313	1-124-434-00	ELECT 220MF	20%	4V
C314	1-163-117-00	CERAMIC CHIP 100PF	5%	50V
C315	1-163-036-00	CERAMIC CHIP 0.068MF		50V
C320	1-163-181-00	CERAMIC CHIP 100PF	5%	50V
C321	1-163-117-00	CERAMIC CHIP 100PF	5%	50V
C601	1-124-434-00	ELECT 220MF	20%	4V
CF1	1-567-090-00	FILTER, CERAMIC		
CF2	1-577-354-61	FILTER, CERAMIC		
CF3	1-577-091-11	OSCILLATOR, CRYSTAL (19kHz)		
CF4	1-577-354-61	FILTER, CERAMIC		
CN301	*1-565-370-11	HOUSING, CONNECTOR 5P		
CN302	*1-565-380-11	HOUSING, CONNECTOR 7P		
CP601	1-466-100-11	SERVO UNIT		
CV1	1-151-636-11	CAP, VAR, POLYETHYLENE (including CT1-1,CV1-4)(TUNING)		
D1	8-719-800-76	DIODE 1SS226		
FL1	1-236-169-11	FILTER, BAND PASS		
HP901	1-543-596-11	HEAD, MAGNETIC (PLAYBACK)		
IC1	8-759-230-39	IC TA8122AF		
IC301	8-759-820-66	IC LA4580M		
J301	1-565-287-31	JACK (HEADPHONES)		
J302	1-565-286-11	JACK, OUTER POWER (DC IN 3V)		
JR3	1-216-295-00	METAL GLAZE 0	5%	1/10W
JR5	1-216-295-00	METAL GLAZE 0	5%	1/10W
JR6	1-216-295-00	METAL GLAZE 0	5%	1/10W
JR7	1-216-295-00	METAL GLAZE 0	5%	1/10W
JR9	1-216-295-00	METAL GLAZE 0	5%	1/10W
JR10	1-216-295-00	METAL GLAZE 0	5%	1/10W
JR11	1-216-296-00	METAL GLAZE 0	5%	1/8W
JR12	1-216-296-00	METAL GLAZE 0	5%	1/8W
JR13	1-216-296-00	METAL GLAZE 0	5%	1/8W
JR14	1-216-296-00	METAL GLAZE 0	5%	1/8W
JR15	1-216-296-00	METAL GLAZE 0	5%	1/8W
JR16	1-216-296-00	METAL GLAZE 0	5%	1/8W

Ref.No.	Part No.	Description			
JR17	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR18	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR19	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR20	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR21	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR24	1-216-296-00	METAL GLAZE	0	5%	1/8W
JR25	1-216-295-00	METAL GLAZE	0	5%	1/10W
L1	1-459-960-11	COIL (WITH CORE) (RF)(FM)			
L2	1-459-959-11	COIL (WITH CORE) (OSC)(FM)			
L3	1-402-415-21	ANTENNA, FERITE-ROD (AM)			
L4	1-406-332-11	COIL (OSC)(AM)			
L5	1-410-209-51	INDUCTOR CHIP 27UH			
L6	1-410-209-51	INDUCTOR CHIP 27UH			
L101	1-410-209-51	INDUCTOR CHIP 27UH			
L201	1-412-011-31	INDUCTOR CHIP 27UH			
M901	1-541-648-11	MOTOR, DC			
Q1	8-729-403-17	TRANSISTOR XN1215			
Q2	8-729-201-26	TRANSISTOR 2SC2715			
Q301	8-729-100-66	TRANSISTOR 2SC1623			
R1	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R2	1-216-017-00	METAL GLAZE	47	5%	1/10W
R6	1-216-059-00	METAL GLAZE	2.7K	5%	1/10W
R9	1-216-198-00	METAL GLAZE	1K	5%	1/8W
R101	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R102	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R103	1-216-034-00	METAL GLAZE	240	5%	1/10W
R104	1-216-105-00	METAL GLAZE	220K	5%	1/10W
R105	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W
R106	1-216-224-00	METAL GLAZE	12K	5%	1/8W
R107	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R113	1-216-308-00	METAL GLAZE	4.7	5%	1/10W
R114	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R116	1-216-025-00	METAL GLAZE	100	5%	1/10W
R201	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R202	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R203	1-216-034-00	METAL GLAZE	240	5%	1/10W
R204	1-216-105-00	METAL GLAZE	220K	5%	1/10W
R205	1-216-071-00	METAL GLAZE	8.2K	5%	1/10W
R206	1-216-224-00	METAL GLAZE	12K	5%	1/8W
R207	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R213	1-216-308-00	METAL GLAZE	4.7	5%	1/10W
R214	1-216-097-00	METAL GLAZE	100K	5%	1/10W
R216	1-216-025-00	METAL GLAZE	100	5%	1/10W
R301	1-216-262-00	METAL GLAZE	470K	5%	1/8W
R302	1-216-081-00	METAL GLAZE	22K	5%	1/10W
R303	1-216-308-00	METAL GLAZE	4.7	5%	1/10W

Ref.No.	Part No.	Description
RV301	1-238-490-11	RES, VAR, CARBON 20K/20K (VOLUME)
RV601	1-238-237-11	RES, ADJ, CERMET 470 (TAPE SPEED)
S1	1-570-660-11	SWITCH, SLIDE (BAND/SENS)
S301	1-571-478-11	SWITCH, SLIDE (TAPE)
S310	1-571-859-21	SWITCH, LEAF (TC POWER)
S311	1-571-859-11	SWITCH, LEAF (DIR)
S312	1-571-478-11	SWITCH, SLIDE (FUNCTION)
T1	1-404-793-11	TRANSFORMER, IF (AM)
T301	1-409-461-11	COIL, TRAP

ACCESSORY & PACKING MATERIAL

*3-342-930-11	STOPPER
3-346-518-01	CLIP, BELT
3-351-508-01	TUBE, PROTECTION
*3-351-552-01	CUSHION (UPPER)
*3-351-553-01	CUSHION (LOWER)
*3-351-569-01	(Canadian)...INDIVIDUAL CARTON
3-750-071-11	(Canadian)...MANUAL, INSTRUCTION
3-750-071-22	(US).....MANUAL, INSTRUCTION
8-952-260-92	MDR-W10L/1 SET
8-952-260-92	HEADPHONE MDR-W10L//K SET

9-953-660-11

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